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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,070	08/02/2001	Joseph C. Barrett	42390.P4934D2	7988

8791 7590 05/23/2003

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EXAMINER

CHU, CHRIS C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 05/23/2003

14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/921,070

Applicant(s)

BARRETT, JOSEPH C.

Examiner

Chris C. Chu

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2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16 - 42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16 - 42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Declaration and Request

1. The declaration under 37 C.F.R. § 1.131 filed on March 5, 2003 under 37 CFR 1.131 is sufficient to overcome Tokuno and Low et al.
2. Applicant's request filed on March 5, 2003 for reconsideration of the non-final rejection of the last Office action is persuasive and, therefore, the non-final rejection of the last Office action is withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 16, 17, 19, 20, 24, 25, 29, 30, 34, 35, 38 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Murakami.

Regarding claim 16, Murakami discloses in Fig. 4 and Fig. 5 an apparatus comprising:

- a substrate (17);

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- a chip (11) mounted on the substrate; and
- a mold cap (14) disposed over the substrate such that the mold cap at least partially covers the chip, the mold cap having an extension (13) extending into a corner section of the substrate.

Regarding claim 17, Murakami discloses in Fig. 5 the extension being a rib structure.

Regarding claim 19, Murakami discloses in Fig. 5 the extension extending into the corner section of the substrate without extending to an edge of the substrate.

Regarding claims 20, 30 and 39, Murakami discloses in Fig. 3 and Fig. 5 the mold cap (14) having chamfered edges.

Regarding claim 24, Murakami discloses in Fig. 4 and Fig. 5 an apparatus comprising:

- a substrate (17);
- a chip (11) mounted on the substrate; and
- a mold cap (14) disposed over the substrate such that the mold cap at least partially covers the chip, the mold cap having a plurality of extensions (13) extending into a respective corner section of the substrate.

Regarding claim 25, Murakami discloses in Fig. 5 the extension being a rib structure.

Regarding claim 29, Murakami discloses in Fig. 5 at least one extension extending into a respective corner section of the substrate without extending to an edge of the substrate.

Regarding claim 34, Murakami discloses in Fig. 4 and Fig. 5 an apparatus comprising:

- a substrate (17);
- a chip (11) mounted on the substrate; and

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- a mold cap (14) disposed over the substrate such that the mold cap at least partially covers the chip, the mold cap having an extensions (13) adjacent a corner section of the substrate.

Regarding claim 35, Murakami discloses in Fig. 5 the extension being a rib structure.

Regarding claim 38, Murakami discloses in Fig. 5 the mold cap having a plurality of extensions each adjacent a respective corner section of the substrate.

Claim Rejections - 35 USC § 103

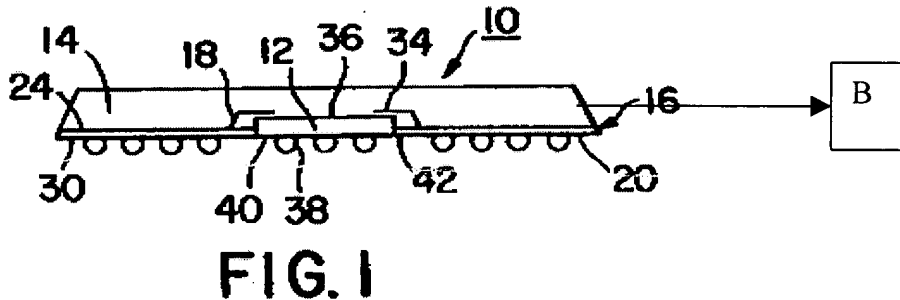
5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 18 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Haley.

Regarding claims 18 and 28, Murakami discloses the claimed invention except for the extension extending to an edge of the substrate. However, Haley discloses in Fig. 1 an extension (B, see next page of this Office action) extending to an edge of a substrate (16). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Murakami by using the extension as taught by Haley. The ordinary artisan would have been motivated to modify Murakami in the manner described above for at least the purpose of

providing enough stiffness to structurally support the integrated circuit (column 3, lines 43 and 44).



7. Claims 21 ~ 23, 31 ~ 33 and 40 ~ 42 rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami and Haley as applied to claims 16, 24 and 34 above, and further in view of Tokita et al. (U.S. Pat. No. 5, 732, 465).

Regarding claims 21, 31 and 40, Murakami, as modified, discloses the claimed invention except for a plurality of solder balls on a surface of the substrate opposite the mold cap. However, Tokita et al. discloses in Fig. 19 a plurality of solder balls (30) on a surface of a substrate (10) opposite the mold cap. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify Murakami by using the plurality of solder balls as taught by Tokita et al. The ordinary artisan would have been motivated to further modify Murakami in the manner described above for at least the purpose of increasing the bond strength between the substrate and the printed circuit board.

Regarding claims 22, 32 and 41, Tokita et al. discloses in Fig. 19 a plurality of solder balls (30) on the surface of the substrate (10) in an area directly opposite a chip (20).

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Regarding claims 23, 33 and 42, Tokita et al. discloses in Fig. 19 all solder balls on the surface of the substrate being spaced from areas directly opposite an edge of the chip.

8. Claims 26, 27, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Logsdon.

Regarding claims 26 and 36, Murakami discloses the claimed invention except for each extension being a rounded structure. However, Logsdon discloses in Fig. 1 and column 3, lines 43 ~ 47 each extension (38) being a rounded structure. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Murakami by using the rounded structure for the extension as taught by Logsdon. The ordinary artisan would have been motivated to modify Murakami in the manner described above for at least the purpose of minimizing the amount of material (column 2, line 10).

Regarding claims 27 and 37, Murakami discloses the claimed invention except for each extension being a rounded corner of the mold cap. However, Logsdon discloses in Fig. 1 and column 3, lines 43 ~ 47 each extension (38) being a rounded corner of the mold cap (12). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Murakami by using the rounded structure for the extension as taught by Logsdon. The ordinary artisan would have been motivated to modify Murakami in the manner described above for at least the purpose of minimizing the amount of material (column 2, line 10).

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Response to Arguments

9. Applicant's arguments are found persuasive. See new Office action above.

Conclusion

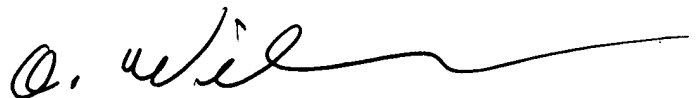
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
May 16, 2003



ALLAN R. WILSON
PRIMARY EXAMINER